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VOLCANIC ERUPTION IN THE BERING SEA.

By permission of Professor Mendenhall, Superintendent U. S. Coast and Geodetic Survey, Professor Davidson furnishes the following information concerning the uprising of volcanic islets in the Bering Sea.

THE RECENT VOLCANIC ERUPTION OF BÓGOSLOV.

The volcanic islet St. John Bógoslov, or "Old Bógoslov," lies in the southern part of the Bering Sea, thirty-seven nautical miles west by north from the north-western point of Unaláska Island, and twenty-nine miles north-north-west from the northern point of Umnak Island. Its geographical position is latitude $53^{\circ} 57'$, and longitude $168^{\circ} 00'$ west. It is therefore forty-four miles west from the living volcano of Makúshin, which is 5,691 feet above the sea. It has been frequently seen in eruption since Cook passed it on the 29th of October, 1778, at a distance of eleven miles to the south-east. At that time Old Bógoslov had the Ship Rock lying a short distance to the north-west, and doubtless connected with it.

Between 1823 and 1888 there were no signs of eruption reported, when a new and much larger islet was raised, with an exhibition of flames, smoke, steam and ashes from the deep water to a height, then estimated from 800 to 1,200 feet, but which has settled down to about 700 feet.

It may however be of interest to refer chronologically to this and the immediately adjacent volcanoes in bring-

ing up the history of Bógoslov, from Greywink, Weniaminoff, Tebenkof and others :

- 1768. Volcano Makúshin on Unaláska Island and the other volcanoes active. Bógoslov seen by Levasheff.
- 1778. Bógoslov seen by Cook, showed no signs of activity.
- 1790. Volcano Akután on Akután Island, 3,888 feet high, and distant 76 miles E. by N. from Old Bógoslov, smoking ; Makúshin in activity at intervals to 1792.
- 1796. Old Bógoslov reported to have risen from the sea : probably great changes took place that year.
- 1800. Old Bógoslov was increasing in size from this date to 1815.
- 1802. Makúshin in eruption, vomiting forth great fires ; earthquakes : Bógoslov smoking, hot geysers.
- 1826. Makúshin smoking ; two heavy earthquakes in June.
- 1830. Volcanic eruption at the south-west end of Umnak Island in August.
- 1838. Makúshin and Akután smoking.
- 1844. Makúshin smoking feebly.
- 1852. Volcanic eruption on the north-west side of Akután. (Archimandritoff.)
- 1867. Makúshin and Akután and Shisháldin smoking. Earthquake at Iliuliúk in March ; great cracks in the earth visible in September ; Davidson's party made first ascent of Makúshin and determined elevation.

1883. Old Bógoslov quiet, but the New Bógoslov, five or six times the area and much higher, rose to the north-west of Ship Rock and connected therewith. (Captains Hague and Anderson of Alaska Commercial Company to Davidson.)
1884. The New Bógoslov is covered with steam jets, and is connected with Ship Rock and old Bógoslov with gravel isthmus. The Ship Rock nearer the New Bógoslov. The New Bógoslov is about 700 feet above the sea, and can be ascended but a short distance in one or two places. (Captain Healy, and Lieut. Doty, U. S. Revenue Marine to Davidson.)*
1888. Since 1884 the Captains of the Alaska Commercial Company have repeatedly reported to Davidson that the New Bógoslov has been decreasing in height. It has been repeatedly photographed, particularly by officers of the U. S. Revenue Marine, and by Captain Nichols, U. S. N., on Coast Survey duty. Captain Nichols ascended some distance in 1888, when it was still hot and smoking, and the whole surface crumbling to ashes and falling away. He measured the height, nearly 700 feet.

This was the condition of the volcanic islets until the 10th of February, 1890, when a sudden eruption took place, and the great light and clouds of pumice ashes filled the sky. The 17th and the 22d were also marked by great activity; and *from the Village of Iliuliuk the*

*For views, charts and description, see Appalachia No. 1., Vol. IV.,; Science Vol. III., p. 282.

flames were seen over the crest line of Makúshin: and angles of elevation were measured by Mr. Applegate to determine the height of the volumes of smoke and ashes. Iliuliúk is twelve nautical miles east of Makúshin, so that this volcano lies directly in the line between the village and Bógoslov. If we assume that the flames seen over Makúshin were the highest exhibit of the eruption, their elevation would be about five miles; the measurements further indicated that the ashes and clouds of steam rose to an elevation of over fourteen miles.

Mr. Neumann, the Agent of the Alaska Commercial Company at Iliuliúk, Unaláska, writes to the Company, as follows:

"The past winter has been mild. Bógoslov has been very active during the winter. On February 10th, 17th and 22d ashes were blown to this place, of which I forward sample. On the last mentioned date a column of smoke was observed here, estimated to be 15 miles high. The old island is reported to have been raised considerably, and new land has risen from the sea." Captain Erskine brought a bottle of these ashes to Davidson. He was at Tchernikoff Bay, and reports:

"The Old Bógoslov lies 40 miles N. 35° W. from the mouth of the bay, which is situated on the north side of Unaláska Island, 11 miles from its southwestern extremity and 8 miles from the eastern face of Umnak Island. The natives formerly could see the Old Bógoslov, and the New, on rare occasions, when the weather was very clear; now they see the mass very plainly under similar circumstances. This would indicate the new islets as being over 1,000 feet high. They report that there are

three new islets formed by this last eruption, and that they are close to, but not connected with, the Old Bógoslov."

The Aleuts have been terrified at all their villages on Unaláska, and they recall the traditions which relate much suffering to have occurred to them after great convulsions and earthquakes among the Islands. In the present case they report that the great flames shot high into the sky, and that great masses of burning matter were thrown outwards from on high and fell into the ocean, whence columns of steam arose.

Captain Everett Smith was cod-fishing in the steam whaler *Balena* to the northward of Cape Cheerful, Unaláska Island, and saw the eruption, which he is reported to describe as resembling a great city on fire; but it is not known whether he saw the first outbreak. The Pacific Whaling Company has no letter from him, but he is reported as saying that there are four new islets detached, but near the former Bógoslovs.

Captain Erskine reports that all the snow covered mountains of Umnak, Unaláska and Akután were so thickly covered with ashes that they were lead colored. These ashes did not reach eastward and northward to the tidal station of the United States Coast and Geodetic Survey at St. Paul, Kadiak Island; nor was any unusual phenomenon noted there. On the contrary, the month was a remarkably pleasant one. The ashes collected at Iliuliúk have, according to Davidson, a fair percentage of magnetic oxide of iron, as might be expected.

It should be noted that these new islets must have risen from profound depths. South of the old Bógoslov

there are depths given over 800 fathoms; and about twelve miles away to the north and west there are depths reaching 1,200 fathoms, or more than one and one-third miles.

It is understood that the eruption had somewhat subsided, when the news was sent from Iliuliúk in the latter part of April.

GEORGE DAVIDSON.

SAN FRANCISCO, June 2, 1890.